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LIQUID CRYSTALS FOR ADVANCED TECHNOLOGIES

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DTIC QUALITY INSPECTED 2

Liquid crystalline (LC) materials have found use in many areas of technology and their scope has been extended with the development of liquid crystalline polymers, elastomers, and composite systems. Considerable basic and applied research is being carried out in these areas as was recognized in Symposium I, "Liquid crystals for Advanced Technologies," which presented an opportunity for researchers in different areas to come together, pool resources, and discuss common problems. Synthetic approaches were featured in two half-day sessions which included polymers based upon polydienes, the ring opening polymerization of oxiranes and oxitanes, block-LC copolymers, photoreactive cholesteric materials, and fluorinated low molar mass compounds for LCD applications. A number of presentations throughout the program also centered on the development of glass-forming, low-molecular-weight liquid crystals and their utility in both display and optical applications. Considerable work on polymer-dispersed LC composites was also represented by two half-day sessions highlighting progress in the understanding of switchable scattering films and diffractive gratings formed by a number of phase separation processes. Sessions on display and optical applications of these LC-based compounds, modeling, rheology, chiral smectics, thermosets, and processing techniques were complemented by over two dozen posters in the evening session.

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FINAL TECHNICAL REPORT - AFOSR GRANT F49620-96-1-0118

Symposium Title: "LIQUID CRYSTALS FOR ADVANCED TECHNOLOGIES"

Place: 1996 MRS Spring Meeting
San Francisco, CA
April 8 - 12, 1996

Organizers: Timothy J. Bunning, SAIC, Wright Patterson Air Force Base
Shaw H. Chen, University of Rochester
Will Hawthorne, Elsevier Trends Journals
Tisato Kajiyama, Kyushu University
Naoyuki Koide, Science University of Tokyo

Objective: To provide a forum for latest advances in molecular design and synthesis, theories and molecular simulation, morphology, rheology and processing, and potential applications based on active and passive device concepts. Topics covering both low molar mass and polymeric liquid crystals, including liquid crystal/polymer composite systems, were presented in invited lectures, contributed papers, and a poster session.

Meeting Summary: As researchers leverage resources and work toward practical ends, the strong interactions among colleagues and competitors have become increasingly important. The 1996 MRS Spring Meeting is testimony to this way of doing business, with by far the largest turnout for an MRS spring meeting (nearly 3200 attendees for 2500 oral and poster presentations), a growing participation in tutorials in which over 90 attendees gathered to learn about ferroelectrics on a holiday weekend.

The 29 parallel technical symposia, along with Symposium X on Frontiers of Materials Research, scheduled April 8-12, 1996 in the San Francisco Marriott were orchestrated by Meeting Chairs Thomas F. Kuech (University of Wisconsin-Madison), Clifford L. Renschler (Sandia National Laboratories) and Chuang Chuang Tsai (Kerox Palo Alto Research Center). Darrel R. Tenney, Chief of the Materials Division of the National Aeronautics and Space Administration's (NASA) Langley Research Center, gave the plenary talk on aerospace materials research. During the plenary ceremony on Monday night, award recipients were honored for the Outstanding Young Investigator Award and the Graduate Student Awards. The exhibit, sold out at 123 booths, was open from Tuesday through Thursday.

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**Symposium
Summary:**

Liquid crystalline (LC) materials have found use in many areas of technology and their scope has been extended with the development of liquid crystalline polymers, elastomers, and composite systems. Considerable basic and applied research is being carried out in these areas as was recognized in Symposium I, "Liquid Crystals for Advanced Technologies," which presented an opportunity for researchers in different areas to come together, pool resources, and discuss common problems. Synthetic approaches were featured in two half-day sessions which included polymers based upon polydienes, the ring opening polymerization of oxiranes and oxitanes, block-LC copolymers, photoreactive cholesteric materials, and fluorinated low molar mass compounds for LCD applications. A number of presentations throughout the program also centered on the development of glass-forming, low-molecular-weight liquid crystals and their utility in both display and optical applications. Considerable work on polymer-dispersed LC composites was also represented by two half-day sessions highlighting progress in the understanding of switchable scattering films and diffractive gratings formed by a number of phase separation processes. Sessions on display and optical applications of these LC-based compounds, modeling, rheology, chiral smectics, thermosets, and processing techniques were complemented by over two dozen posters in the evening session.

**Proceedings
Volume 425
Summary:**

This volume contains papers presented at Symposium I. Liquid crystals have emerged as a class of organic materials with potential applications to optics, photonics, and optoelectronics. Although a large number of liquid crystals have been discovered or synthesized over the years, fundamental understanding of structure-property relationships at the molecular level is still lacking at present. Regardless, liquid-crystalline materials have found use in many areas of technology and their scope has been extended with the development of liquid-crystalline polymers, elastomers, and composite systems. Moreover, new emerging advanced technologies, such as flat-panel displays, optical computing and communications, and imaging will call for improved materials as well as novel multifunctional materials.

The work presented was truly multinational with presenters from Belarus, China, England, France, Germany, Hong Kong, Italy, Japan, Netherlands, Puerto Rico, Russia, Taiwan and the U.S.A. The broad level of interest represented by the papers in this proceedings highlight the diversity of materials research and development being explored to make this class of materials community viable in a number of applications areas.

**Timothy J. Bunning
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Prepared by:

**Donna J. Gillespie
Symposium Funding Administrator
Materials Research Society
May 16, 1997**